DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated September 10, 2010.

2. **Claims 48-70, and 72-73** have been amended.

3. **Claim 71** has been cancelled.

4. **Claims 48-73** are still pending.

Response to Arguments

5. Objection of **claim 58** is withdrawn because amendment corrects typographical error.

6. Rejections of **claims 48-49, and 67** under 35 U.S.C. 112, second paragraph are withdrawn because amendment overcomes rejections.

7. Rejections of **claims 61-63, and 72-73** under 35 U.S.C. 101 are withdrawn because amendment overcomes rejections.

8. Applicant's arguments with respect to the prior art rejection over **claims 48-73** have been considered but they are persuasive. Examiner maintains the previous rejections.

9. Regarding claims **48-57, 60, 64-69, and 72-73**, applicant agues (pp.10-11) that Cammas doesn't disclose, or suggest, the idea of comparing a motion image and a corresponding estimated motion image, so as to obtain a motion difference image, and of comparing a texture image and a corresponding estimated texture image so as to obtain a texture difference image. Cammas discloses temporal transform for both

motion and texture in Fig.5, and further teaches in detail comparing a motion image and a corresponding estimated motion image and comparing a texture image and a corresponding estimated texture image ($D = X_{odd} - P \cdot X_{even}$) in Fig.7.

10. Regarding **claim 58**, applicant agues (pp.11-12) that neither Cammas nor Van Beek discloses the idea of comparing a motion image and a corresponding estimated motion image, so as to obtain a motion difference image, and of comparing a texture image and a corresponding estimated texture image so as to obtain a texture difference image. Since examiner maintains that Cammas discloses this limitation as above, the argument is groundless. Secondly, applicant argues that Van Beek does not suggest the idea of defining a texture masking. Examiner respectfully disagrees. Van Beek teaches padding the pixels inside of mesh but outside of VOP. Applicant further argues that the use of a reference grid defined by the position of nodes of a mesh, and the idea of projecting an image on the reference grid, are not disclosed in Van Beek. Examiner maintains that they are disclosed in Cammas (see claim 1).

11. Regarding **claim 59**, applicant agues (pp.12) that neither Cammas nor Nelson discloses the idea of comparing a motion image and a corresponding estimated motion image, so as to obtain a motion difference image, and of comparing a texture image and a corresponding estimated texture image so as to obtain a texture difference image. Since examiner maintains that Cammas discloses this limitation as above, the argument is groundless. Applicant further agues (pp.12) that Nelson doesn't suggest applying this type of wavelets to the encoding and decoding of video sequences and thus, one skilled in the art would have no motivation to combine this document Nelson with the document

Cammas, in order to apply antisymmetry to the wavelet coefficients corresponding to an edge of the image. Examiner respectfully disagrees. Cammas discloses wavelets to the encoding and decoding of video sequences and there is a motivation (to simulate a signal with support of infinite length, pp.8, line 16) to combine Nelson.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. **Claims 48-57, 60-69, and 72-73** are rejected under 35 U.S.C. 102(b) as being anticipated by Cammas (Proceedings of SPIE-IS&T, vol.5022, pp.358-365) (hereafter referenced as Cammas) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Cammas.

Regarding **claim 48**, Cammas discloses Fine Grain Scalable Video Coding Using 3D Wavelets and Active Meshes. Cammas specifically discloses A method for encoding of a sequence of source images(Fig.5, General view of the analysis-synthesis video coding scheme), implementing a motion/texture decomposition (Decoupling motion/texture, Fig.5), producing, for at least certain of the source images, information representing motion (Hierarchical motion representation, pp.363, line 10), called motion images (motion information, pp.363, line 17), and information representing texture

(texture, pp.363, line 12), called texture images, and wavelet encoding (wavelet transform, pp.363, line 9),

wherein the method comprises the following steps:

- estimating the motion (3.2 motion estimation, pp.360, line 1-9) so as to obtain said motion images (active meshes, pp.360, line 1-9);
- projecting (frames are mapped on pp.360, line 8) each of said source images on at least one reference grid (reference grid, pp.360, line 8) so as to obtain said texture images (texture information, pp.360, line 8-9), on which the effect of the motion has been cancelled (a temporal transformation is performed along the motion trajectories, pp.360, line 13);
- comparing a motion image and a corresponding estimated motion image so as to obtain a motion difference image (temporal transform in Fig.5 applies to both Motion as well as text, to get the difference, $D = X_{odd} - P \cdot X_{even}$ in Fig.7), called a motion residue;
- comparing a texture image and a corresponding estimated text image so as to obtain a texture difference image (temporal transform in Fig.5 applies to both Motion as well as text, to get the difference, $D = X_{odd} - P \cdot X_{even}$ in Fig.7);

and

- independent wavelet encoding of said motion residues and said texture residues (Fig.5 shows decoupling Motion/Texture and Coding independently)

Regarding **claim 49**, Cammas, as applied to claim 48, teaches *wherein that said comparison implements a difference with an interpolated image using at least the first and/or the last image of said sequence* (Fig.7 Lifting Scheme).

Regarding **claim 50**, Cammas, as applied to claim 48, *wherein a temporal encoding* (temporal transformation, Fig.5) *of said texture is performed, being rectified by said motion* (wavelet transform along the motion trajectory, pp.360, 3.3 Temporal Transform) *preliminarily encoded along the temporal axis, by means of a wavelet encoding* (temporal subbands are then transformed by 2D Spatial wavelet transform, pp.362, chapter 3.4 Coding Strategy).

Regarding **claim 51**, Cammas, as applied to claim 48, discloses *wherein the method comprises an encoding of the texture comprising a temporal wavelet encoding followed by spatial wavelet encoding* (temporal subbands are then transformed by 2D Spatial wavelet transform, pp.362, chapter 3.4 Coding Strategy).

Regarding **claim 52**, Cammas, as applied to claim 48, wherein the method comprises a motion encoding that takes account of a meshing. (active meshes, pp.360, chapter 3.0 Motion estimation).

Regarding **claim 53**, Cammas, as applied to claim 48, discloses *wherein the method comprises a motion encoding comprising a temporal wavelet encoding followed by spatial wavelet encoding* (temporal subbands are then transformed by 2D Spatial wavelet transform, pp.362, chapter 3.4 Coding Strategy).

Regarding **claim 54**, Cammas, as applied to claim 48, discloses *wherein said source images are grouped together in image blocks comprising a variable number (N) of source images* (Group of N frames, pp.360, chapter 3.2 Motion estimation).

Regarding **claim 55**, Cammas, as applied to claim 54, discloses *wherein two successive image blocks comprise at least one common image* (Motion Estimation between successive frames using active meshes, chapter 3.2 Motion estimation).

Regarding **claim 56,** Cammas, as applied to claim 48, discloses *wherein said source images are grouped together in image blocks* (Group of N frames, pp.360, chapter 3.2 Motion estimation) *and, in each of said image blocks, the motion of all the images of an image block is estimated from the first image of said block* (Successive lifting steps P and U are performed, pp.362, line 4, therefore the information of the first frame is used for all the images).

Regarding **claim 57,** Cammas, as applied to claim 48, discloses *wherein said source images are grouped together in image blocks* (Group of N frames, pp.360, chapter 3.2 Motion estimation) *and said projection step uses two reference grids respectively representing the first and last images of the block considered* (predicted using bi-directional compensation, pp.359, line 12-15, and Fig.4).

Regarding **claim 60,** Cammas, as applied to claim 48, discloses *wherein the encoded data are distributed into at least two layers (scalable coder, pp.362, line 10), a bottom layer* (inherent in scalable coder) *comprising data enabling an image of coarse quality to be reconstructed and a top layer* (inherent in scalable coder) *enabling the quality of said coarse image to be refined.*

Regarding **claim 61,** claim 48 has all the features of claim 61. Therefore, the claimed invention is anticipated by Cammas.

Regarding **claim 62,** claim 60 has all the features of claim 62. Therefore, the claimed invention is anticipated by Cammas.

Regarding **claim 63,** Cammas, as applied to claim 61, further discloses wherein the signal comprises three fields to describe an object (active mesh, pp.360), respectively representing its motion (motion, pp.360), its texture (texture, pp.360) and its shape (triangular mesh, Fig.6).

Regarding **claim 64,** Cammas, as applied to claim 48, discloses Method for the decoding of a sequence of source images (Fig.5 General view of the analysis-Synthesis video coding scheme), encoded (For encoding, see the above claim 1)by an encoding implementing a motion/texture decomposition, producing, for at least certain of said source images, information representing motion, called motion images, and information representing texture, called texture images, and wavelet encoding, wherein said wavelet encoding is applied to difference images, called residues, obtained by comparison between a source image and a corresponding estimated image (For encoding, see the above claim 1), wherein the method for decoding comprises the following steps: decoding the motion (Coding at Fig.5 includes both encoding and decoding of motion), in taking account of at least certain of said residues pertaining to the motion (temporal transform in Fig.5 applies to both Motion as well as text, to get the difference), to form motion images; decoding the texture (Coding at Fig.5 includes both encoding and decoding of texture), in taking account of at least certain of said residues (temporal

transform in Fig.5 applies to both Motion as well as text, to get the difference) pertaining to texture, to form texture images; and synthesizing a sequence of decoded images (Synthesis, Fig.5), corresponding to said sequence of source images, by projection of said texture images on said motion images (mapping texture informations on their original grid, pp.362, first line below chapter 3.5 Synthesis).

Regarding **claim 65,** Cammas, as applied to claim 64, discloses *wherein it comprises a measurement step of the quality of said sequence of decoded images* (measurement represent texture quality of reconstructed video sequence, pp.362, line 21-24), *by analysis of the distortion between the original texture images and decoded texture images* (Texture PSNR is estimated between the texture and frames and decoded texture frame, pp.362, line 21-24).

Regarding **claim 66,** Cammas, as applied to claim 64, discloses *wherein it comprises a management step of the reversals* (mapping texture informations on their original grid, pp.362, first line below chapter 3.5 Synthesis, which is equivalent to reversal of projection of a mesh to a reference grid) *generated by said motion estimation*.

Regarding **claim 67,** Cammas, as applied to claim 64, discloses *wherein it comprises a stopping step of the processing of said residues, when a level of quality and/or a quantity of processing operations to be performed is attained* (video bitstream can be decoded at different qualities associated with different bitrates, pp.362, line 13-14).

Regarding **claim 68**, the claimed invention is a device claim corresponding to the method claim 48. Therefore, it is rejected for the same reason as claim 48.

Regarding **claim 69**, the claimed invention is a device claim corresponding to the method claim 64. Therefore, it is rejected for the same reason as claim 64.

Regarding **claim 72**, the claimed invention is a computer readable medium claim corresponding to the method claim 48. Therefore, it is rejected for the same reason as claim 48.

Regarding **claim 73**, the claimed invention is a computer readable medium claim corresponding to the method claim 64. Therefore, it is rejected for the same reason as claim 64.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. **Claim 58** is rejected under 35 U.S.C. 103(a) as being unpatentable over Cammas in view of Van Beek (US 5,936,671) (hereafter referenced as Van Beek).

Regarding **claim 58**, Cammas discloses everything claimed as applied above (see claim 48). Cammas further discloses *wherein it comprises:*

projecting step of an image on at least one reference grid (frames are mapped on reference grid, pp.360, line 8), *corresponding to a sampling grid defined by the position*

of the node (inherent in mesh because mesh is polygon such as triangle) *of a meshing in an image, so as to obtain a texture mask (texture to be mapped, pp.359, last 2 lines).*

However, Cammas fails to disclose *a detection step of at least one image support zone that has remained undefined after said projection of an image, owing to the use of a reference grid corresponding to another image, and a padding step of the said undefined image support zone or zones.*

In the analogous field of endeavor, Van Beek discloses Object –Based Video Processing Using Forward-Tracking 2-D mesh layers. Van Beek specifically discloses *a detection step (Fig.5) of at least one image support zone that has remained undefined (Fig.5: pixels not inside the VOP boundary) after said projection of an image (mesh boundary must always fall exactly on the actual video object plane boundary), owing to the use of a reference grid corresponding to another image, and a padding (Fig.5: need to be Padded) step of the said undefined image support zone or zones,* in order to map the pixels inside of mesh but outside of VOP (Fig.5).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Cammas by providing *a detection step of at least one image support zone that has remained undefined after said projection of an image, owing to the use of a reference grid corresponding to another image, and a padding step of the said undefined image support zone or zones*, in order to map the pixels inside of mesh but outside of VOP. The Cammas Fine Grain Scalable Video Coding using 3D wavelet and Active Meshes, incorporating a computing device, further incorporating the Nelson anti-symmetric wavelet coefficients, further

incorporating the Van Beek mapping the pixels inside of mesh but outside of VOP by padding, has all the features of claim 58.

16. **Claim 59** is rejected under 35 U.S.C. 103(a) as being unpatentable over Cammas in view of Nelson (PhD Thesis, Anglia Polytechnic University, 2001) (hereafter referenced as Nelson).

Regarding **claim 59**, Cammas discloses everything claimed as applied above (see claim 48). However, Cammas fails to disclose *wherein an antisymmetry is applied to the wavelet coefficients corresponding to an edge of the image so as to simulate a signal with support of infinite length*.

In the analogous field of endeavor, Nelson discloses The Construction of Some Riesz Basic Families and their Application to Coefficient quantization, Sampling Theory, and Wavelet Analysis. Nelson specifically discloses that *antisymmetry* (Symmetry or Anti-symmetry is imposed upon an orthonormal wavelet, pp.7, last 2 lines) *is applied to the wavelet coefficients corresponding to an edge of the image, in order to simulate a signal with support of infinite length* (infinite support, pp.8, line 16).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Cammas by providing antisymmetric the wavelet coefficients corresponding to an edge of the image, in order to simulate a signal with support of infinite length. The Cammas Fine Grain Scalable Video Coding using 3D wavelet and Active Meshes, incorporating a computing device, further incorporating the Nelson anti-symmetric wavelet coefficients, has all the features of

claim 59.

17. **Claim 70** is rejected under 35 U.S.C. 103(a) as being unpatentable over Cammas.

Regarding **claim 70**, Cammas discloses everything claimed as applied above (see claim 48). However, Cammas fails to disclose a data server which comprises means to implement the encoding method according to any of the claim 48.

However, it was well known in the art that wavelet coding requires a computing device (*data server*) such as a computer or dedicated hardware, in order to perform computations and storing data for wavelet coding.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Cammas by providing a computing device, in order to perform computations and storing data for wavelet coding. The Cammas Fine Grain Scalable Video Coding using 3D wavelet and Active Meshes, incorporating a computing device, has all the features of claim 70.

Conclusion

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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